

Ser. No. 10/635,694

Amendments to the Claims

1. (Currently amended) A method for restoring a Ti alloy turbine component which has lost first material from a damage site comprising:

applying a backing element to the component, the backing element having a first face and the applying placing a first portion of the first face along the component with a second portion of the first face protruding adjacent the damage site protruding adjacent the damage site so that the deposited Ti-based material builds up on the component and backing element; and

physically depositing a Ti-based material at least partially in place of the first material so that said Ti-based material builds up on the component and the second portion of said first face.

2. (Previously presented) The method of claim 1 wherein:

the method further comprises removing additional material, before said applying, at least partially from the damage site to create a base surface; and

the physically depositing deposits said Ti-based material atop the base surface at least partially in place of the first material and the additional material.

3. (Original) The method of claim 1 wherein:

said deposited Ti-based material in major part replaces said first material.

4. (Original) The method of claim 1 wherein said Ti-based material is selected from the group consisting of Ti-6Al-4V, Ti-6Al-2Sn-4Zr-2Mo, and Ti-8Al-1V-1Mo.

5. (Previously presented) The method of claim 2 wherein the removing of additional material is, in major part, from undamaged portions of the component.

6. (Original) The method of claim 1 wherein the component is a blade having a root and an airfoil and the damage site is along a leading edge of the airfoil inboard of a midspan shroud of the airfoil.

Ser. No. 10/635,694

7. (Original) The method of claim 6 wherein the damage site inboard of the midspan shroud by no more than 15% of a span of the airfoil.
8. (Original) The method of claim 1 wherein the component is a blade having a root and an airfoil and the damage site is along a leading edge of the airfoil between 20% of an airfoil span inboard of a midspan shroud of the airfoil and 10% of said span outboard of said midspan shroud.
9. (Original) The method of claim 1 wherein the component is a blade having a root and an airfoil and the damage site is along a leading edge of the airfoil between 30% of said span inboard of a midspan shroud of the airfoil and 20% of said span outboard of said midspan shroud.
10. (Original) The method of claim 6 wherein the first material is lost to a depth of at least 2.0 mm.
11. (Original) The method of claim 1 wherein said physically depositing comprises electron beam physical vapor deposition.
12. (Canceled)
13. (Canceled)
14. (Original) The method of claim 1 wherein:  
wherein said physically depositing said Ti-based material comprises performing physical deposition in a manner selected from the group consisting of vapor deposition, electron beam physical vapor deposition, and electron beam flash vapor deposition.
15. (Original) The method of claim 14 wherein said physically depositing is performed at a pressure between  $10^{-3}$  and  $10^{-6}$  torr.

Ser. No. 10/635,694

16. (Original) The method of claim 14 wherein said performing said physical deposition is performed at a pressure of approximately  $10^{-4}$  torr.
17. (Original) The method of claim 14 wherein said physically depositing said metal is performed at a rate between 10 and 50 micrometers per minute.
18. (Original) The method of claim 14 wherein said physically depositing said Ti-based material is performed at a rate of approximately 20 micrometers per minute.
19. (Currently amended) The method of claim ~~13~~ 25 further comprising:  
machining said more of the Ti-based material to produce a final contour.
20. (Previously presented) The method of claim 2 wherein:  
the depositing is along a vapor line path less than  $30^{\circ}$  off normal to the base surface.
21. (Previously presented) The method of claim 1 wherein:  
the backing element is applied along a suction side of an airfoil of the element.
22. (Canceled)
23. (Previously presented) The method of claim 1 wherein:  
the applying places the backing element in a position to facilitate a buildup of said Ti-based material in place of the first material.
24. (Previously presented) The method of claim 1 wherein:  
the physically depositing deposits said Ti-based material spanning the component and backing element.
25. (New) A method for restoring a Ti alloy turbine component which has lost first material

Ser. No. 10/635,694

from a damage site comprising:

applying a backing element to the component protruding adjacent the damage site so that the deposited Ti based material builds up on the component and backing element;

physically depositing a Ti-based material at least partially in place of the first material at least partially removing the backing element and machining adjacent deposited material and preexisting material of the component to create a second base surface; and physically depositing more of the Ti-based material atop the second base surface.

26. (New) A method for restoring a Ti alloy turbine component which has lost first material from a damage site comprising:

securing a backing element to the component so that a first portion of a first face is along a surface of the component and a second portion of the first face protrudes beyond the first portion adjacent the damage site; and

physically depositing a Ti-based material at least partially in place of the first material so that the deposited Ti based material builds up on the component and backing element first face second portion.